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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,832	01/17/2006	Robert Fischer	1454.1666	5115

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EXAMINER	
HASSAN, SARAH	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
12/12/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,832	FISCHER ET AL.	
	Examiner	Art Unit	
	SARAH HASSAN	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4,6 and 7* is/are rejected.

7)☒ Claim(s) *5* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/12/06, 1/17/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 4-7 are pending.

Priority

2. Foreign priority granted based on foreign application DE 103 33 514.5 filed on July 17, 2003.

Information Disclosure Statement

3. The information disclosure statements (IDS) filed on April 12, 2006 and January 17, 2006 are acknowledged.

Drawings

4. The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81(c). No new matter may be introduced in the required drawing. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).

Allowable Subject Matter

5. Claim 5 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claim(s) **4-7** is/are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled "Clarification of 'Processes' under 35 U.S.C. 101"). The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 4, 6-7 rejected under 35 U.S.C. 103(a) as being unpatentable over Yu et. al., "Trellis Precoding for the Broadcast Channel" published in 2001, pages 1344-1348 in view of Yao et. al., "Lattice-Reduction-Aided Detectors for MIMO Communication Systems" published in 2002, pages 424-428.

10. As to claim 4, Yu teaches "a nonlinear precoding method" [see page 1346, col. 2, lines 7-10; Figure 2] "based on modulo arithmetic for the transmit-side preequalization of K user signals to be transmitted concurrently using a frequency in a digital broadcast channel with known transmission behavior set up between a central transmitting station and K decentralized, non-interconnected receiving stations" [see page 1344, column 2, lines 1-3]. Yu teaches Tomlinson-Harashima precoder (Figure 2) that operates on a nonlinear basis and is based on the use of "modulo arithmetic" or modulo-M geometry as disclosed in Yu [see page 1346, col. 2, lines 16-21]. In addition Yu also teaches using the Tomlinson-Harashima precoder in an environment where transmitted symbols are corrupted in a broadcast channel due to interference as detailed on page 1344, col. 2,

equation 4. Equation 4 discloses s_k which exemplifies the interference known to the transmitter but not the receiver. The interference arises as a result when the transmitter sends information to two ore more "decentralized, non-interconnected receiving stations" at a time as detailed on page 1344, column 2, lines 1-4.

"the user signals consisting of data symbols ak with k from 1 to K from a signal constellation having Mk levels and a signal point spacing Ak with a periodic multiple representation of the undisturbedly transmitted data symbols ak in data symbol intervals congruent for K receive-side modulo decision devices" [see page 1347, col. 2, lines 9-15]. Yu proposes a trellis constellation diagram or "data symbols ak with k from 1 to K from a signal constellation having Mk levels and a signal point spacing Ak with a periodic multiple representation of the undisturbedly transmitted data symbols ak in data symbol intervals." The trellis code can be combined with Tomlinson precoding to be used as reconstruction values to determine path metrics for synchronization purposes and to help mitigate the effects of the interference components in a data symbol 'ak'.

"a transmit-power-minimizing selection of representatives" and "linear preequalization of the selected representatives Vk to form transmit signals xk to be transmitted" [see page 1345, col. 1, last paragraph]. Yu discloses subtracting interference at the transmitter (preequalization) instead of subtracting interference at the receiver, thereby performing "transmit-power -minimizing selection" because it the transmit power allocated to transmit data symbols to be

mitigated with the help of trellis coding as detailed in page 1347, col. 2, 2nd paragraph.

"including interference symbols in the digital broadcast channel superimposed on the data symbols ak" [see page 1347, Figure 4]. Yu teaches Tomlison Harashima precoder (Figure 4) that is responsible for adding interference and quantization noise to the data symbols and sending information regarding these noise components to the decoder at the receiver through a "digital broadcast channel" as detailed on page 1347, col. 1, lines 6-11.

It should be noted however that Yu does not specifically teach "eliminating the interference symbols by the K receive-side modulo decision devices."

On the other hand, Yao teaches "eliminating the interference symbols by the K receive-side modulo decision devices" [see page 424, col.1-col. 2]. Yao teaches a receiver that detects a transmitted signal and has predetermined knowledge of the channel, in order to eliminate "interference symbols."

It would have been obvious to one of ordinary skill in the art to combine the teachings of Yu with the teachings of Yao because Yao mitigates the effects of multiuser detection problems such as interference in a MIMO system, thereby enhancing the performance of a multi-user communication system as detailed in page 424, col. 1.

11. As to claims 6 and 7, Yu teaches "offset compensation is already carried out on the transmit signals Xk prior to transmission" [see page 1345, col. 1, last

paragraph]. Yu teaches subtracting interference or providing "offset compensation" at the transmitter "prior to transmission."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARAH HASSAN whose telephone number is (571)270-3456. The examiner can normally be reached on Monday through Friday (available 8:00 AM - 5:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571)272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sarah Hassan/
Examiner, Art Unit 2611

/Mohammad H Ghayour/
Supervisory Patent Examiner, Art Unit 2611